

What is Claimed is:

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A'  
1. A method of preparing a lipid vesicle from alkylammonium fatty acid salts, comprising the steps of:

(a) dispersing long chain A-ADDA molecules in a buffering solution to form a dispersion, said buffering solution having a pH within a range of between around 3.0 and 10 and an ionic strength less than or equivalent to 1 molar NaCl; and

(b) subjecting the dispersion to high shear processing.

2. The method defined by claim 1, wherein said load material is added to said buffering solution before said A-ADDA is added.

3. The method defined by claim 1, wherein said load material is added to said buffering solution after said A-ADDA is added.

B 4. The method defined by claim 1, wherein said buffer<sup>ref</sup> solution utilized in said step of dispersing <sup>comprises</sup> ~~includes~~ H<sub>2</sub>O and said alkylammonium fatty acid salt is a trialkylammonium fatty acid salt.

B 5. The method defined by claim 1, wherein said step of dispersing <sup>comprises</sup> ~~includes~~ dispersing with a mechanical homogenizer.

B 6. The method defined by claim 1, wherein said step of dispersing <sup>comprises</sup> ~~includes~~ stirring said A-ADDA and buffering solution at a temperature above that of the melting point of said A-ADDA.

B 7. The method defined by claim 1, wherein said step of dispersing <sup>comprises</sup> ~~includes~~ preparing said buffering solution to have a pH in a range of between 5.5 and 10.5 and an ionic strength of less than the equivalent of 1 molar NaCl.

B 1' 8. The method defined by claim <sup>7</sup>~~8~~, wherein the pH of said buffering solution is approximately 7.5.

Sub B' 9. The method defined by claim 1, wherein said step of subjecting includes applying sufficient mechanical energy to form vesicles of specified dimension.

10. The method defined by claim <sup>B</sup>~~1~~, further including a step of dispersing which includes preparing said A-ADDA from a molecule of ~~ADDA and a fatty acid at a pH of between around 6 to 10,~~

11. The method defined by claim 10, wherein said pH is around 7.

12. The method defined by claim 10, wherein said preparing includes mixing said ADDA molecules in substantially equimolar proportions of ADDA to fatty acid ~~claims~~ of between 10 and 30 carbon atoms.

13. The method defined by claim 10, wherein said fatty acid molecules are linked via an amide bond to a primary amino group of the DDA chain.

14. The method defined by claim <sup>B</sup>~~10~~, wherein a number of carbon atoms of said DDA chain is from about 2 to about 8.

15. The method defined by claim 10, wherein said preparing includes mixing said DDA molecules with a fatty acid of between 10 and 30 carbon atoms.

16. The method defined by claim 10, wherein said preparing ~~utilizes a fatty acid including behenic acid.~~

<sup>10</sup> 17. The method defined by claim <sup>9</sup>~~10~~, wherein said step of dispersing <sup>comprises</sup> ~~includes~~ preparing behenyl-N-behenamido-N2, N2-

dimethyl-propyl-1,3-diamine (B-BDDP).

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18. A lipid vesicle substantially comprised of alkylammonium fatty acid salts, said vesicle formed by a process comprising the steps of:

(a) dispersing long chain A-ADDA molecules in a buffering solution to form a dispersion, said buffering solution having a pH within a range of between around 3.0 and 10 and an ionic strength less than or equivalent to 1 molar NaCl; and

~~(b) subjecting the dispersion to high sheer processing.~~

13 12 19. The vesicle defined by claim 18, wherein said load material is added to said buffering solution before said A-ADDA is added.

13 20. The vesicle defined by claim 18, wherein said load material is added to said buffering solution after said A-ADDA is added.

B 14 21. The vesicle defined by claim 18, wherein said buffer solution utilized in said step of dispersing <sup>comprises</sup> ~~includes~~ H<sub>2</sub>O and the alkylammonium fatty acid salt is trialkylammonium fatty acid salt.

B 15 22. The vesicle defined by claim 18, wherein said step of dispersing <sup>comprises</sup> ~~includes~~ dispersing with a mechanical homogenizer.

B 16 23. The vesicle defined by claim 18, wherein said step of dispersing <sup>comprises</sup> ~~includes~~ stirring said A-ADDA and buffering solution at a temperature above that of the melting point of said A-ADDA.

B 17 24. The vesicle defined by claim 18, wherein said step of dispersing <sup>comprises</sup> ~~includes~~ preparing said buffering solution to have a pH in a range of between 5.5 and 10.5 and an ionic strength of less than the equivalent of 1 molar NaCl.

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25. The vesicle defined by claim 24, wherein the pH of said buffering solution is approximately 7.5.

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~~26. The vesicle defined by claim 18, wherein said step of subjecting includes applying sufficient mechanical energy to form vesicles of specified dimension.~~

27. The vesicle defined by claim 18, further including a step of dispersing which includes preparing said A-ADDA from a molecule of ADDA and a fatty acid at a pH of between around 6 to 10.

28. The vesicle defined by claim 27, wherein said pH is around 7.

29. The vesicle defined by claim 27, wherein said step of preparing includes mixing said ADDA molecules in substantially equimolar proportions of ADDA to fatty acid chains of between 10 and 30 carbon atoms.

30. The vesicle defined by claim 27, wherein said fatty acid molecules are linked via an amide bond to a primary amino group of the DDA chain.

31. The vesicle defined by claim 27, wherein a number of carbon atoms of said DDA chain is from about 2 to about 8.

32. The vesicle defined by claim 27, wherein said preparing includes mixing said DDA molecules with a fatty acid of between ~~10 and 30 carbon atoms.~~

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33. The vesicle defined by claim 27, wherein said preparing utilizes a fatty acid <sup>comprising</sup> behenic acid.

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34. The vesicle defined by claim 27, wherein said step of

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6 dispersing <sup>comprise</sup> ~~includes~~ preparing behenyl-N-behenamido-N2, N2-dimethyl-propyl-1,3-dramine (B-BDDP).

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35. An in vivo delivery system including one of a hydrophilic and hydrophobic material encapsulated within a lipid vesicle and deliverable upon the occurrence of a triggering condition, wherein said lipid vesicle structure substantially comprises an amino N<sub>n</sub>,N<sub>n</sub>-dimethyl-1, d-diamine alkyl chain such that a ~~hydrophilic portion of said vesicle is cationic.~~

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36. The delivery system defined by claim <sup>21</sup> ~~35~~, wherein said cationic portion of said vesicle readily adheres to proteins.

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37. A cationic lipid vesicle comprising a fatty acyl salt of a long chain amide, wherein the stability of said vesicle is ~~controllable by controlling a salt bridge linking said fatty acyl and amide.~~

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38. The cationic lipid vesicle of claim <sup>23</sup> ~~37~~, wherein said salt bridge is controlled by varying at least one of pH and ionic strength of a medium containing said vesicles.

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